

The impact of changing to an Automatic Milking System on dairy performance data and farm structure of dairy farms in Austria

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Installing an automatic milking system (AMS) has a major impact on farm and herd management, and thus on performance data of dairy cows. In this study, the transition period of changing from a conventional milking system (CMS) to an AMS was evaluated with focus on dairy performance data (milk yield, fertility, udder health), and structural data (herd size, land use) of dairy farms.

The raw data comprises the annual milk performance reports from Austrian dairy farmers with AMS during 2006 to 2020. In 2020 about 1100 AMS were in operation, 664 farms could provide at least one annual report, but only 376 farms were evaluated. This is due to the requirements set for selection, that the farm needs to be a member of the LKV Austria in the year of installation, the year prior and the two years after. The data were divided into three groups: (1) the CMS group (the three years before installation of AMS T-1, T-2, T-3); (2) the transition group T (the year of AMS installation T0 and the year after that T1); (3) the AMS group (the three years after transition period T2, T3, T4). Repeated measures ANOVA (rmANOVA) was used to analyse the data. As a result of rmANOVAs requirement to exclude a farm if it is containing a missing value (the farm is not a member of the LKV every year during the sampling period), three different sample sizes were generated for three different periods. All 376 farms were evaluated if the evaluation period was 4 years (T-1 to T2), 269 farms with a 6-year period (T-2 to T3), and 176 farms were analysed over the full 8-year period.

A major change is observed in average herd size, which increased from 39 in T-1 to 52 in T2 ($n=376$; $p=0,000$), which is probably caused by the small size of farms in Austria and the need to utilize the AMS to its capacity. Average milk yield decreased temporarily from 8281 kg in T-1 to 8166 kg in T0 and increased to 8555 kg in T3 ($n=269$; $p=0,000$). T1 and T2 were not statistically different from T-1 concerning milk yield. The somatic cell count, which is a parameter for udder health (the lower the better), went from an average of 198 in T-1 to 221 in T0 and 237 in T4 concerning cows with 2 or more lactations ($n=176$; $p=0,000$). The fertility of the cows worsened by installing an AMS, as the fertility index increased from an average of 1,71 in T-1 to 1,76 in T2 and 1,79 in T4 ($n=165$; $p=0,000$).

Overall, size of farms increased, and milk yield raised as well. On the other hand, fertility and udder health got worse by installing an AMS and may require additional effort to get on the level of CMS farms.

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